

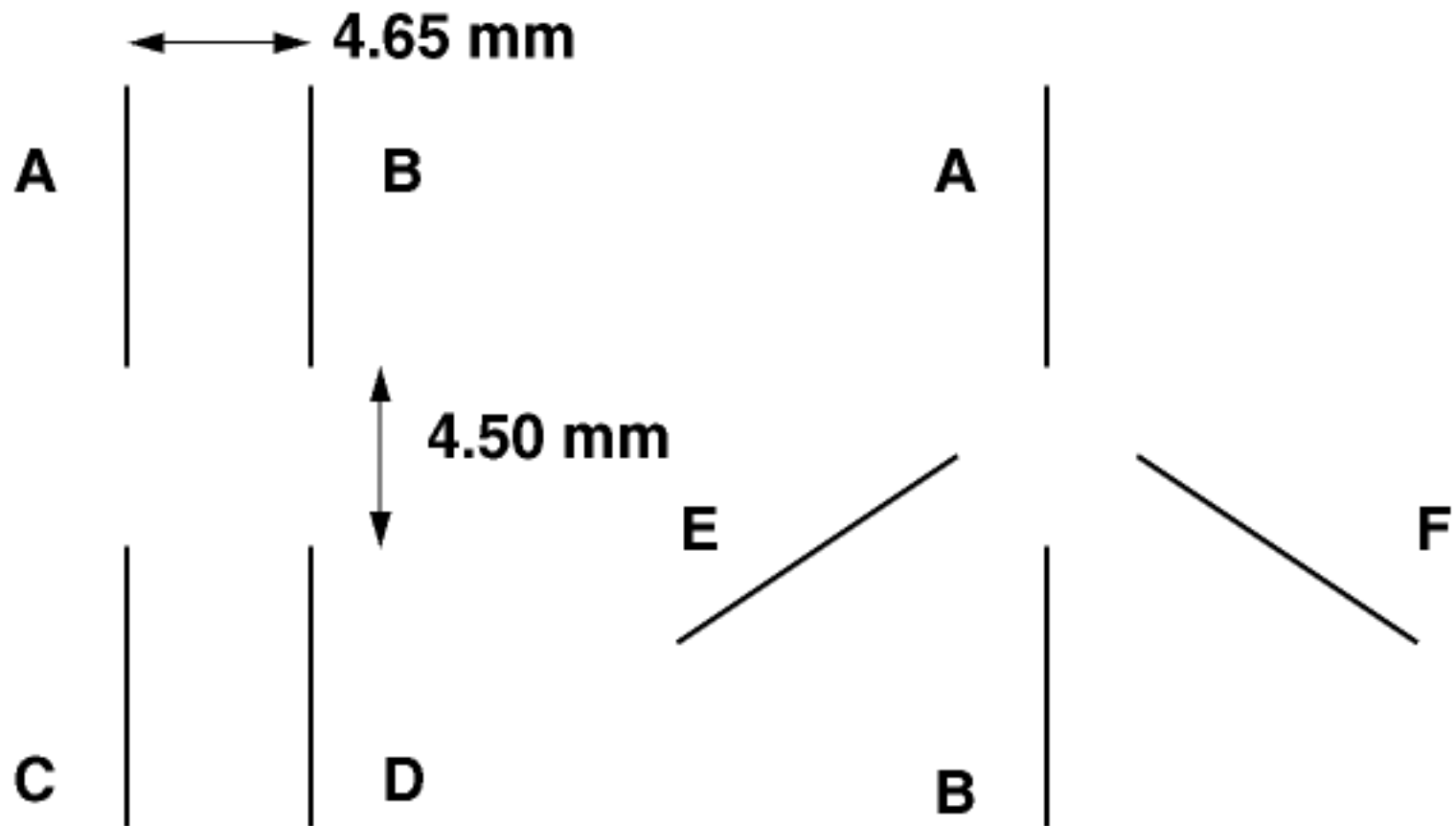
Storage Ring X-ray Beam Position Monitor Development

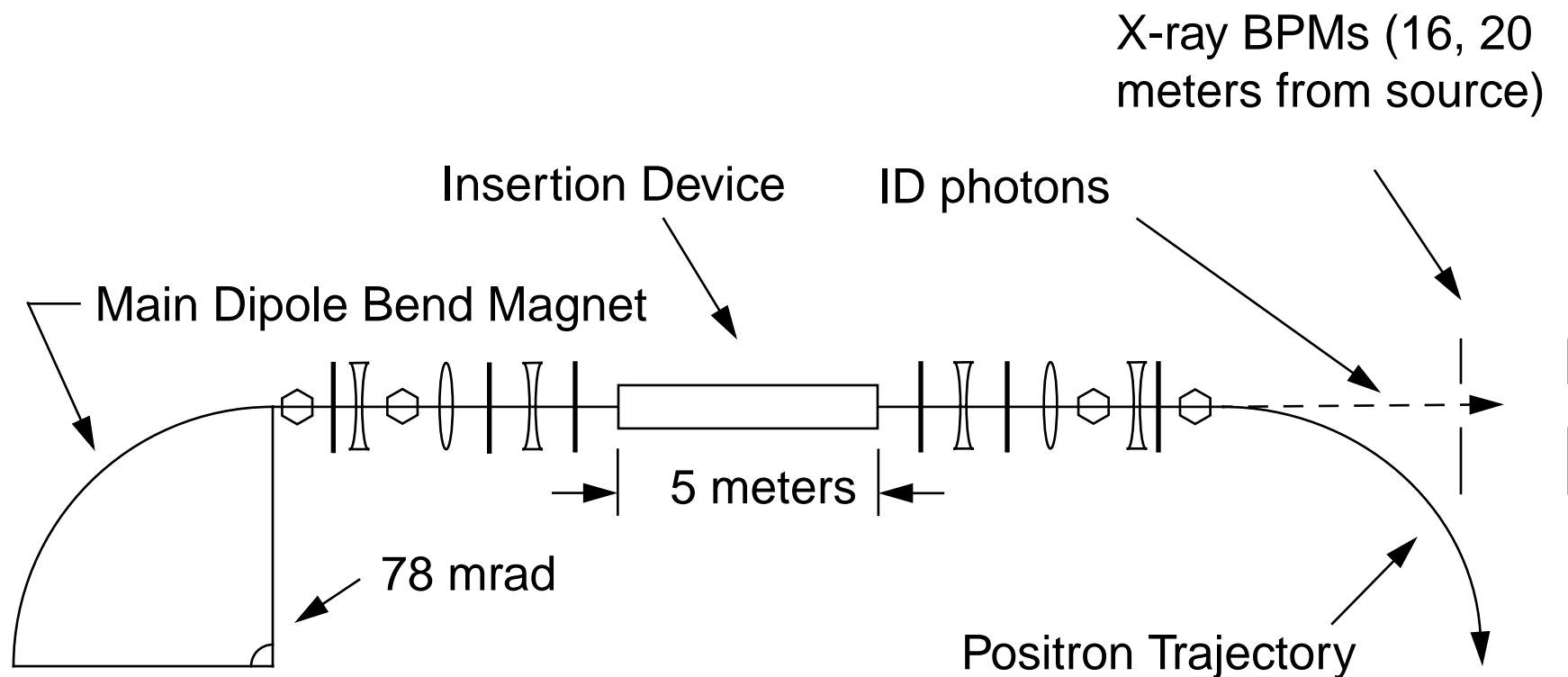
Glenn Decker, Om Singh

- XFD / ASD X-ray beam stability task force (XAXSTF) results
- X-ray BPM - based orbit control





Upstream X-BPM (P1)

Downstream X-BPM (P2)



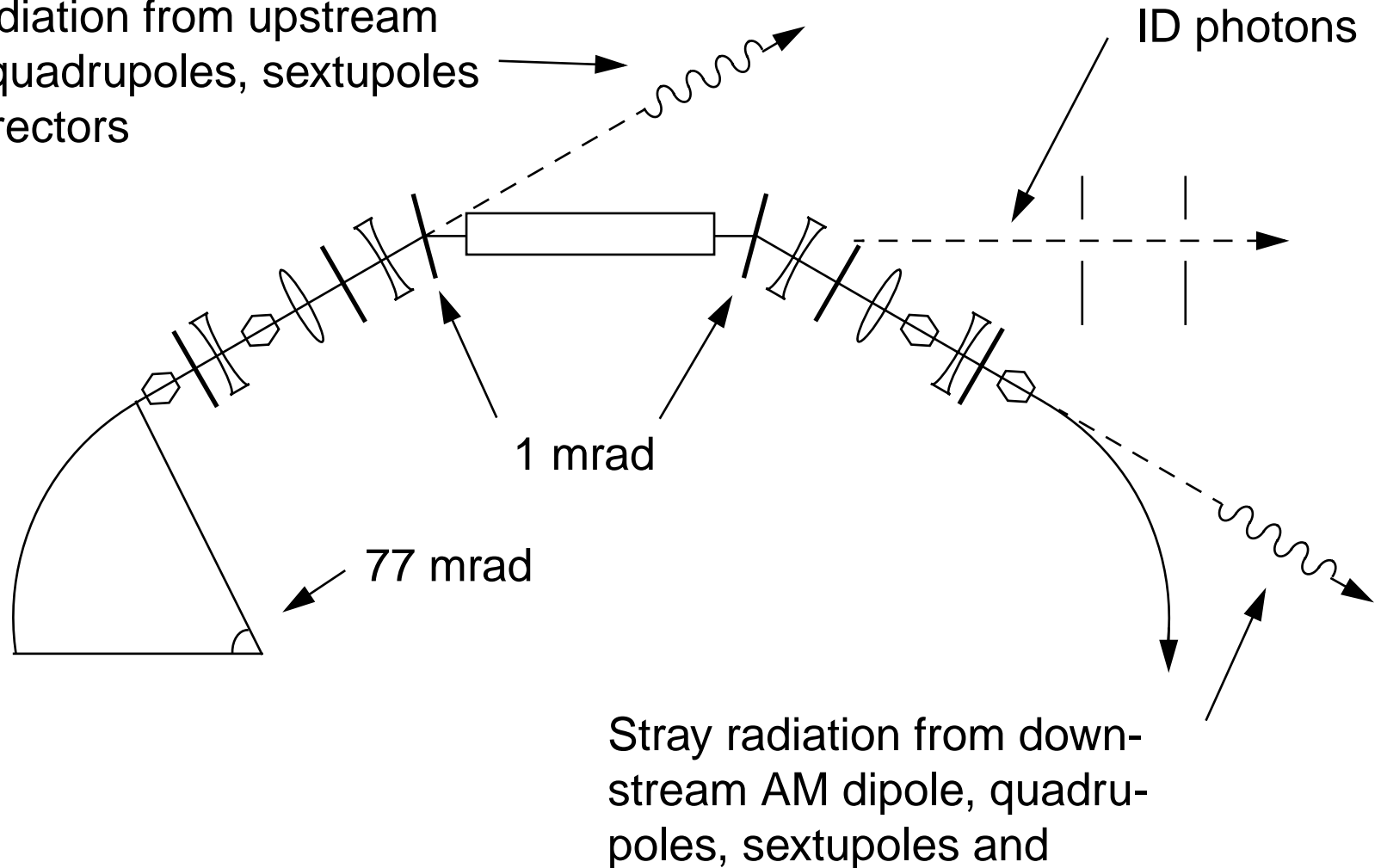


Legend

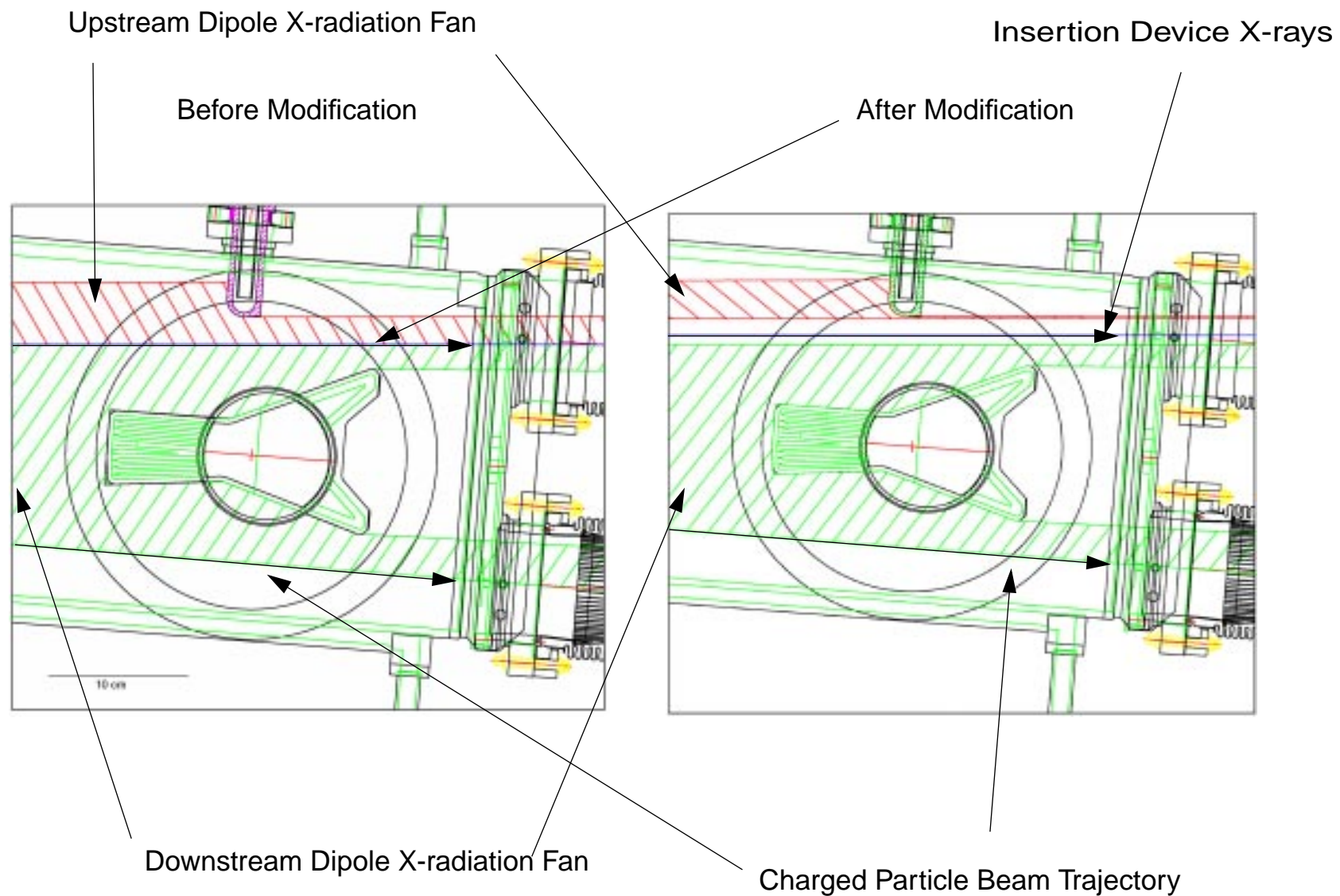
-  Focusing Quadrupole Magnet
-  Defocusing Quadrupole Magnet
-  Sextupole Magnet
-  Combined Function Horiz./ Vert. Steering Corrector Magnet

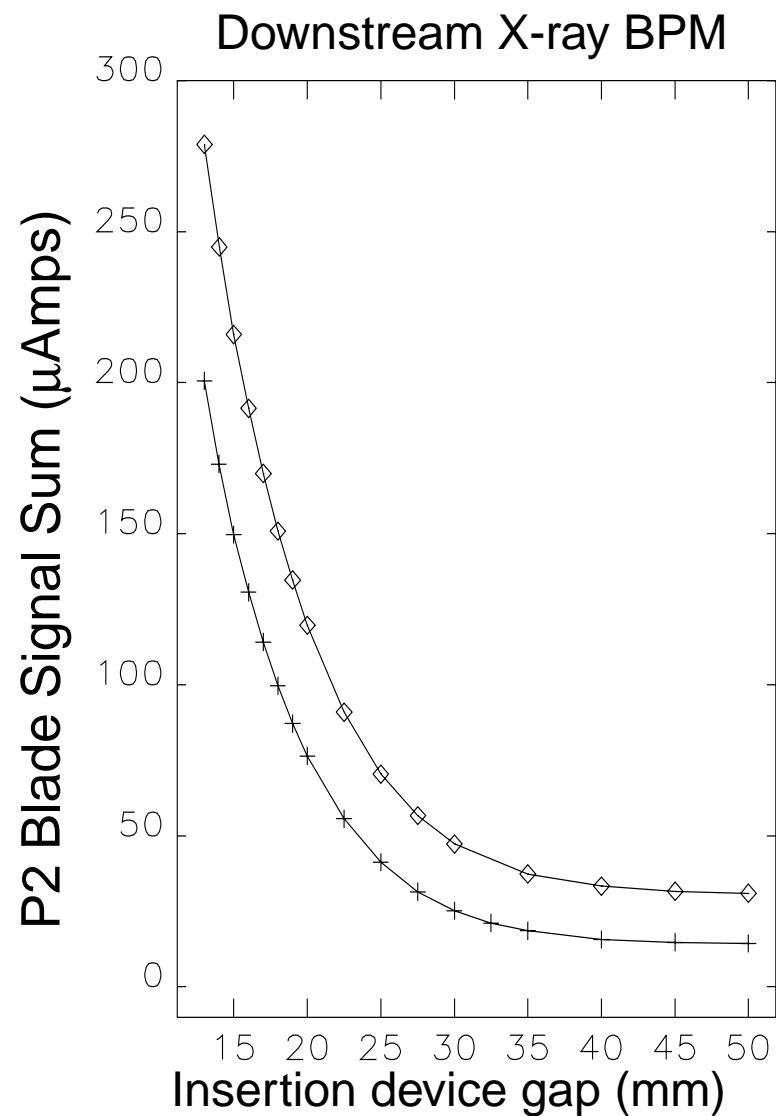
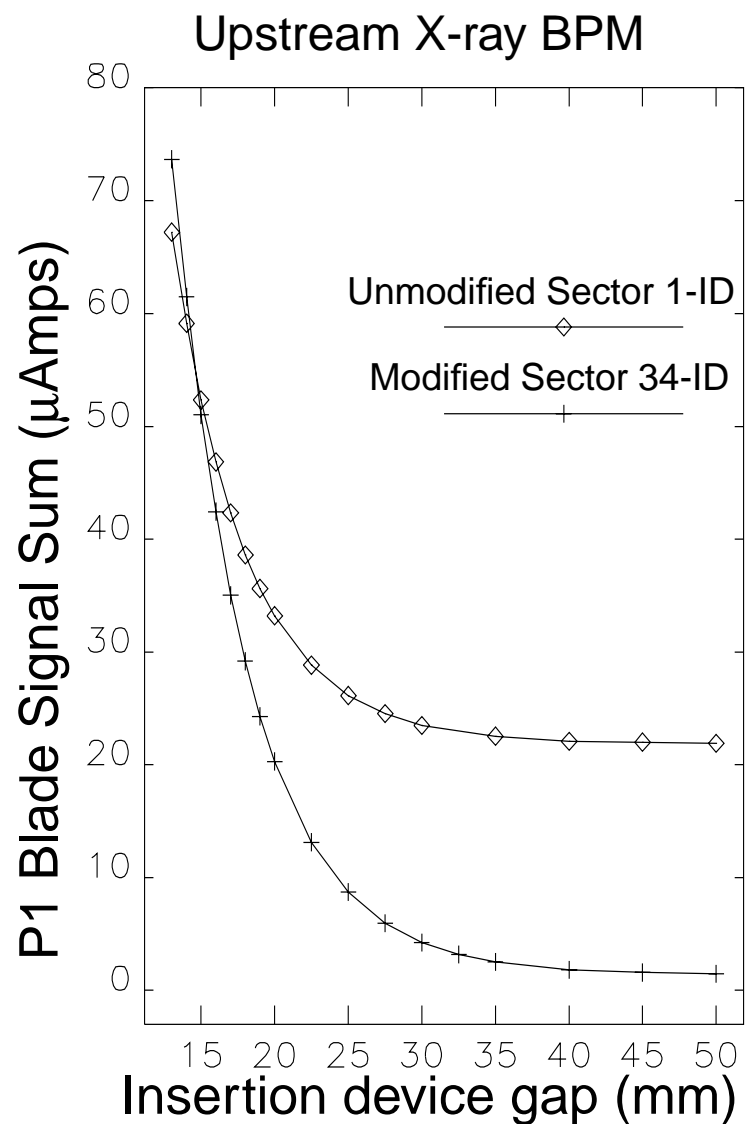
Concept for Reduction of ID X-bpm Stray Radiation Background Signals

Stray radiation from upstream dipole, quadrupoles, sextupoles and correctors

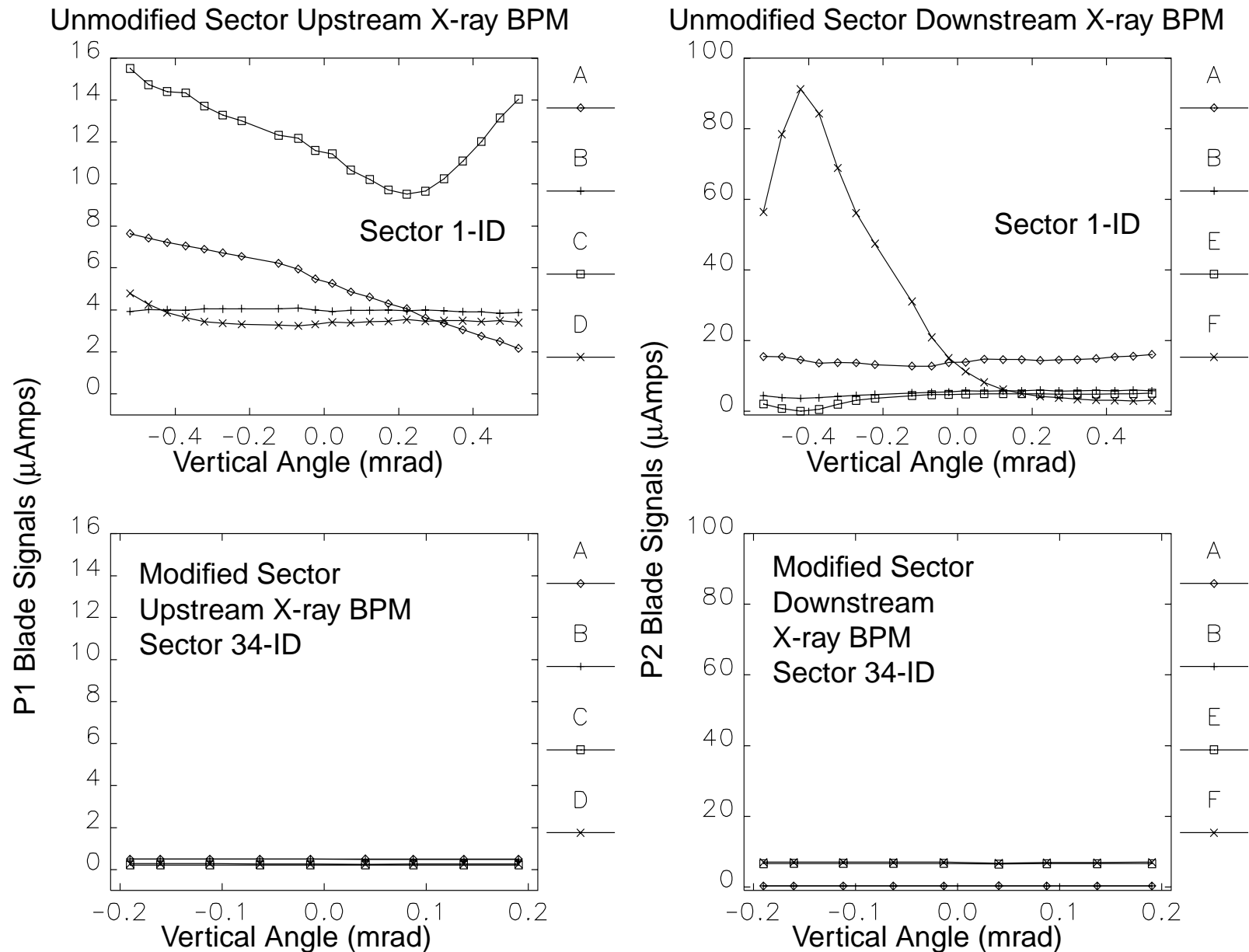


Ray Tracing Analysis for Girders Realignment

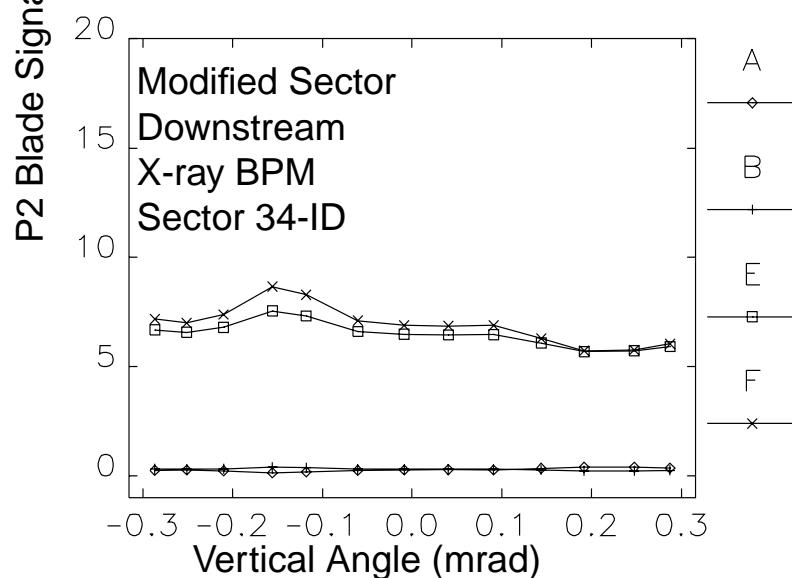
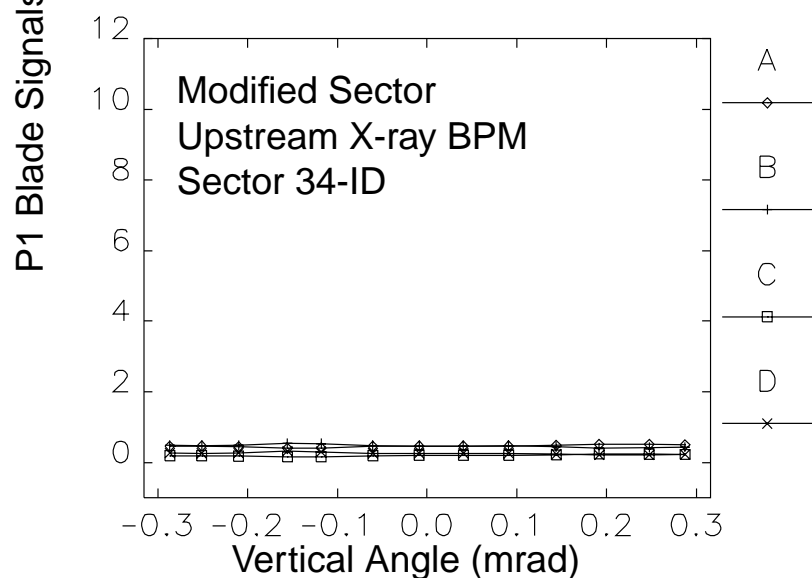
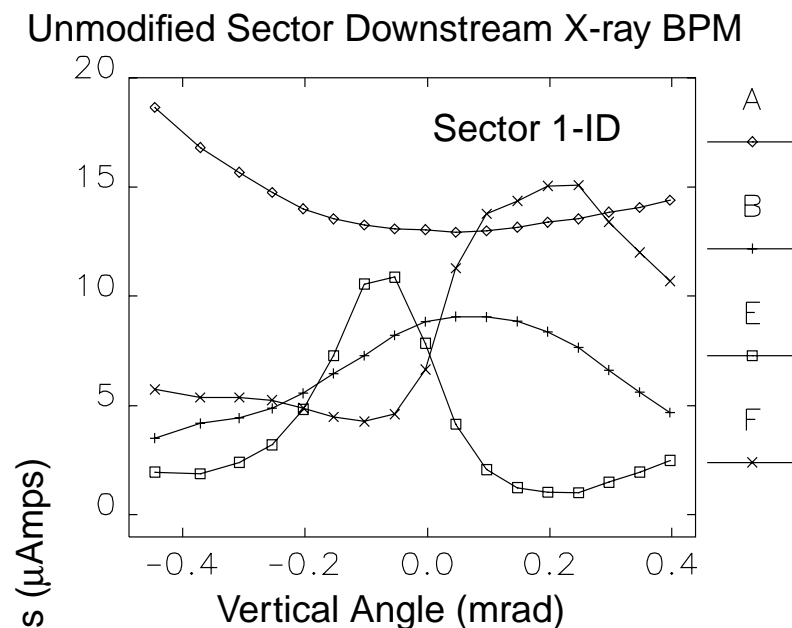
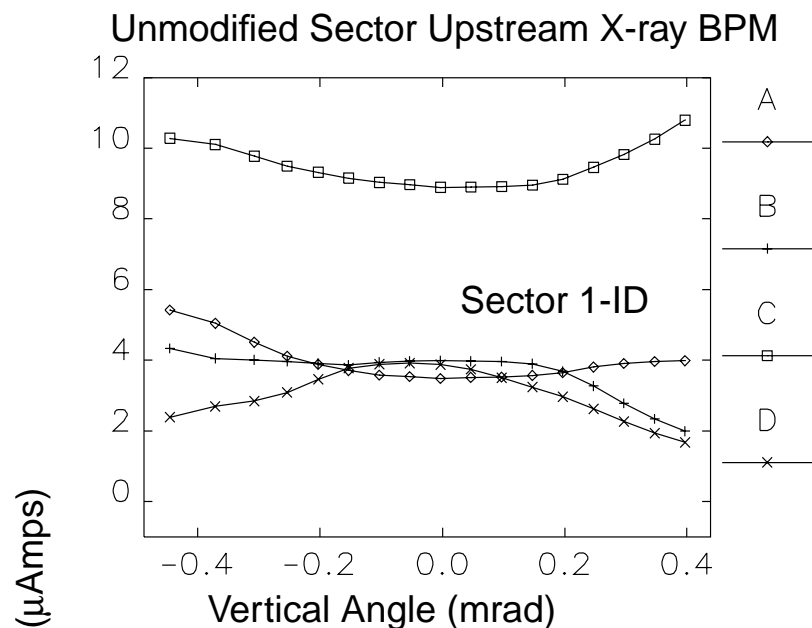




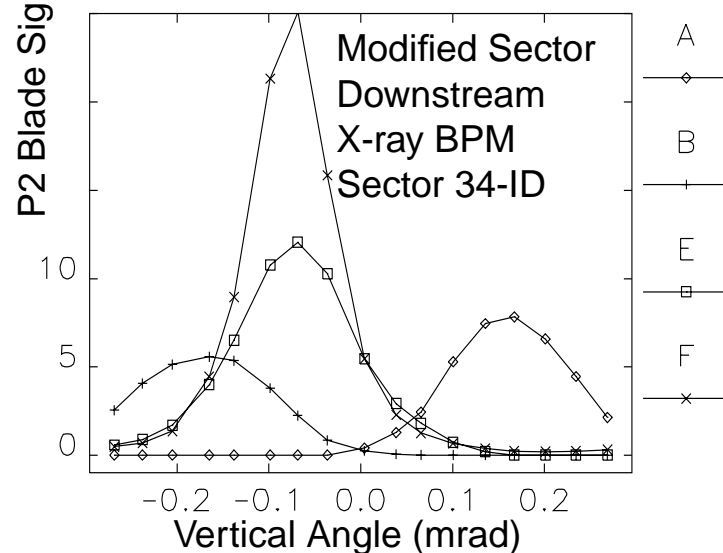
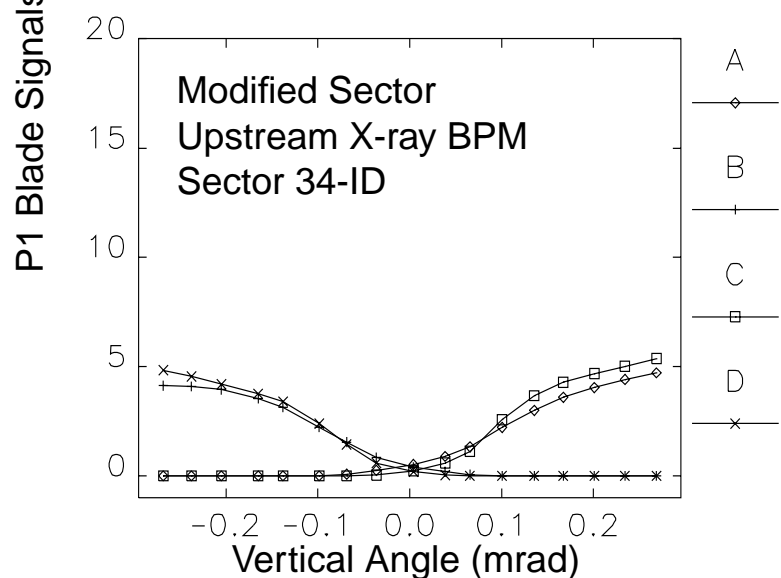
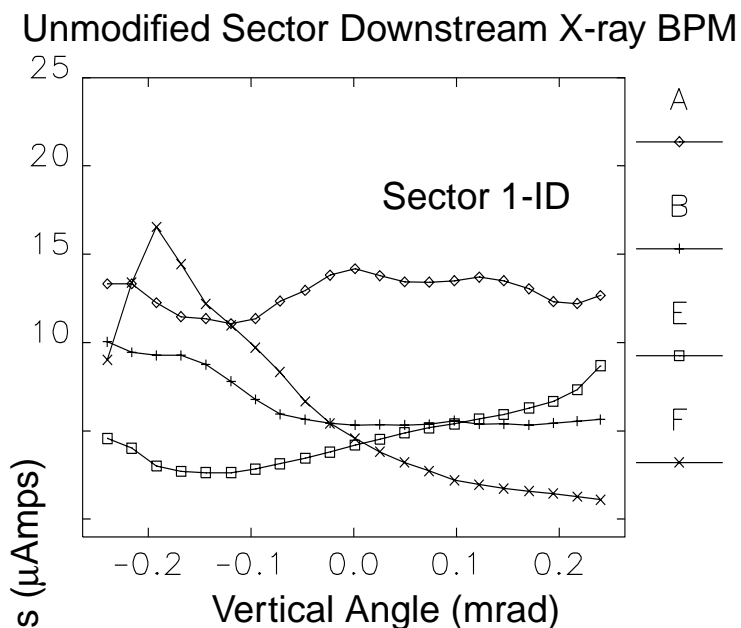
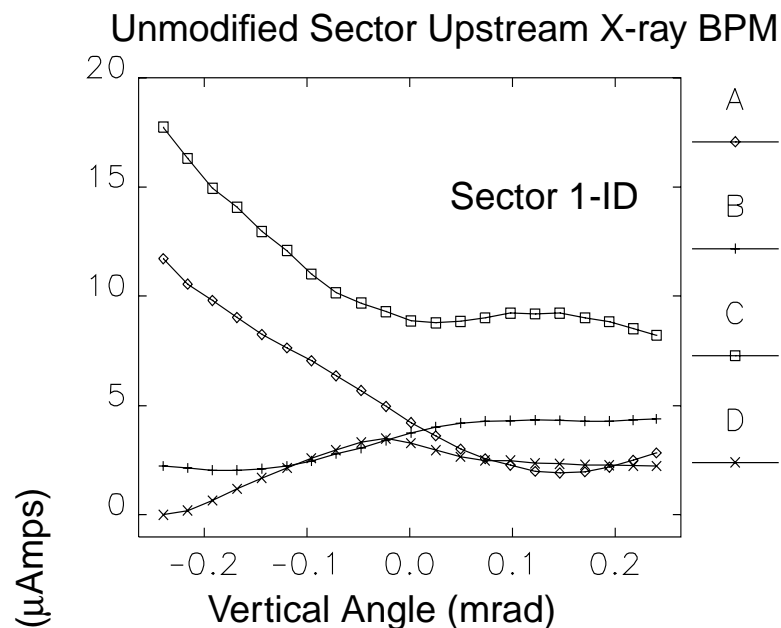
Variation of Insertion Device Beamline Blade Voltages with Downstream Dipole Steering



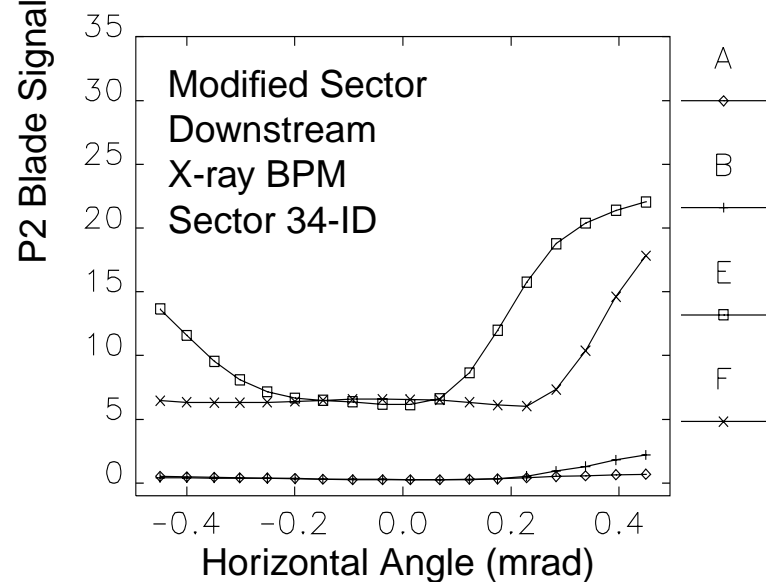
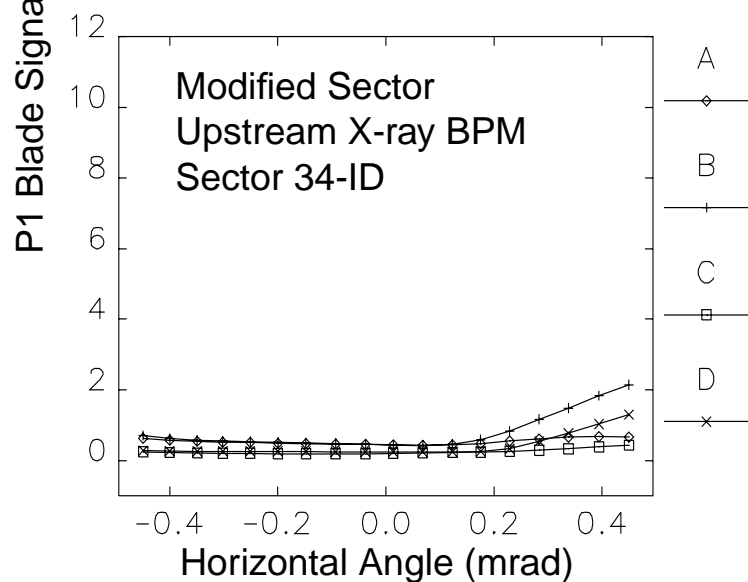
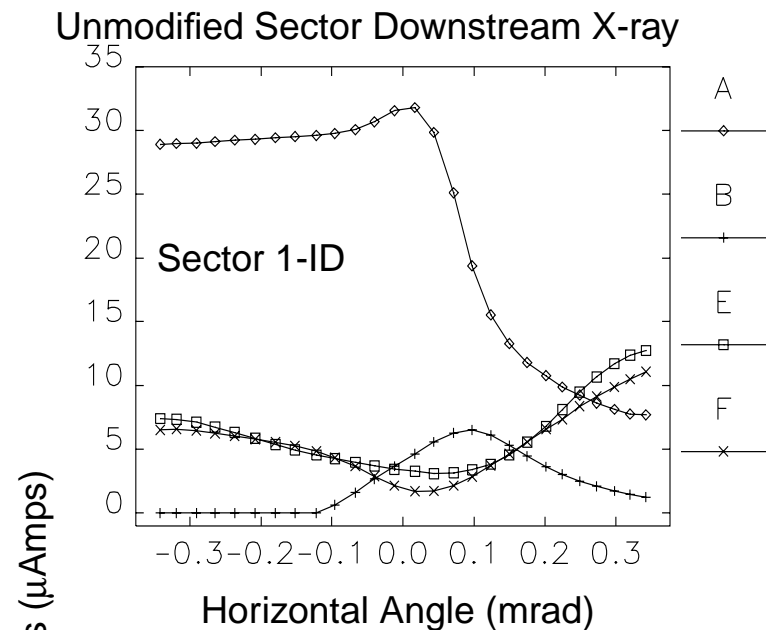
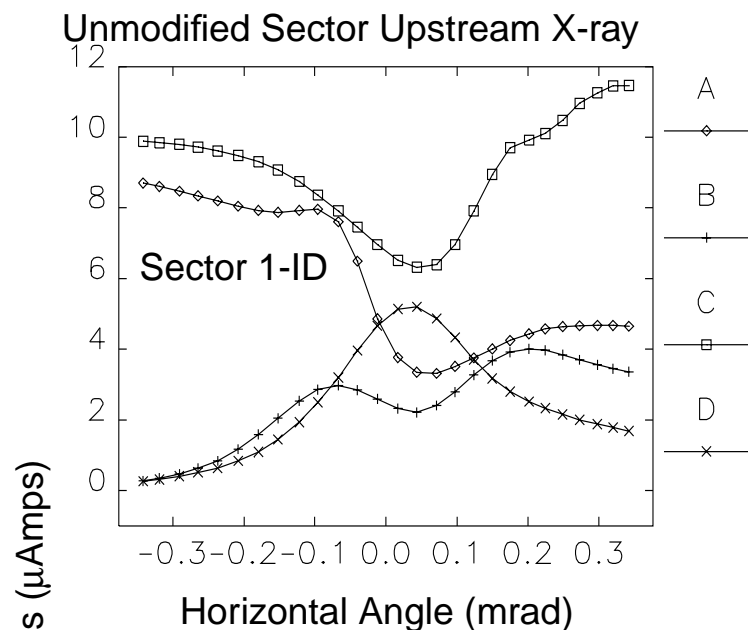
Variation of Insertion Device Beamline Blade Voltages with Upstream Dipole Steering



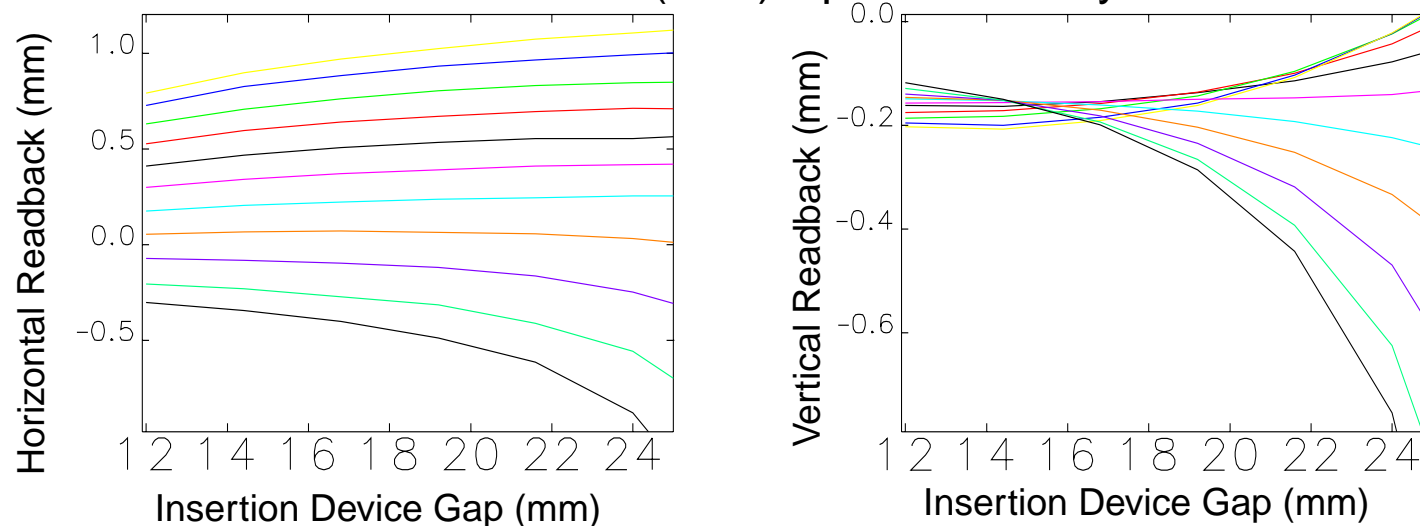
Variation of Insertion Device Beamline Blade Voltages with ID Steering (Open Gap)



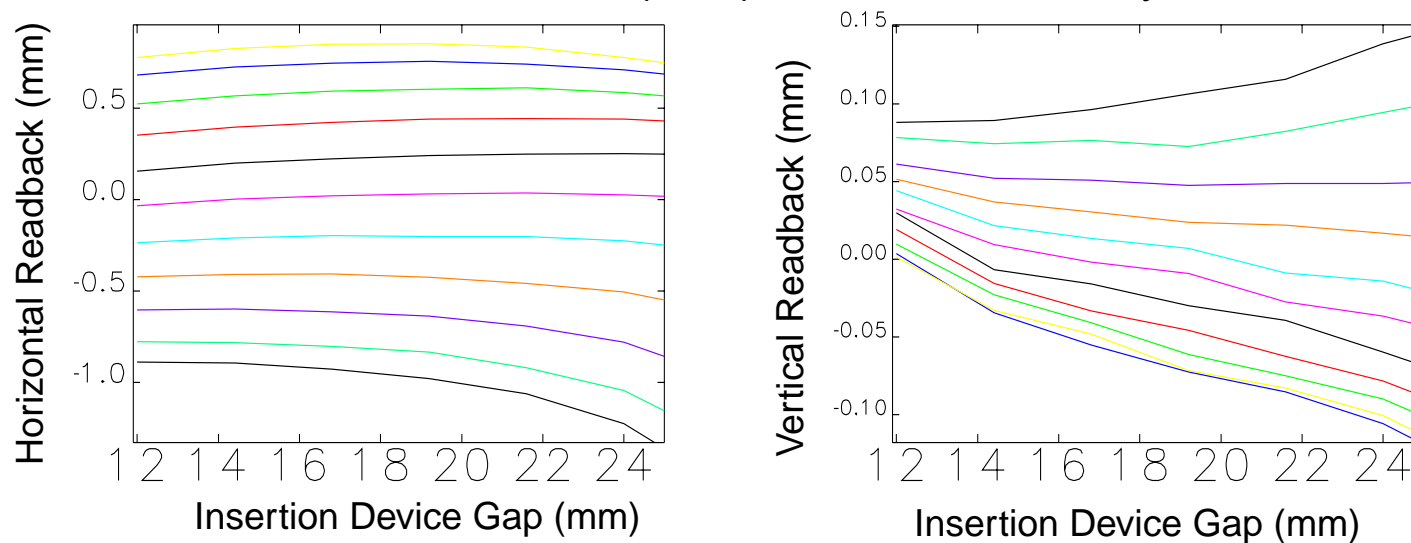
Variation of Insertion Device Beamline Blade Voltages with ID Steering (Open Gap)



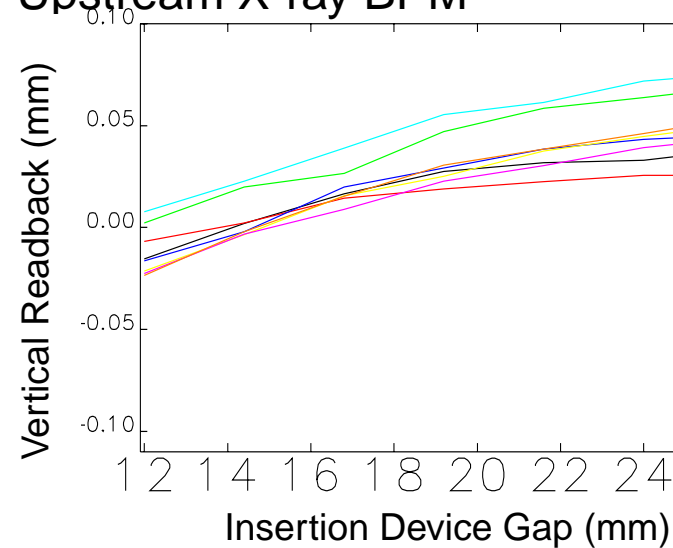
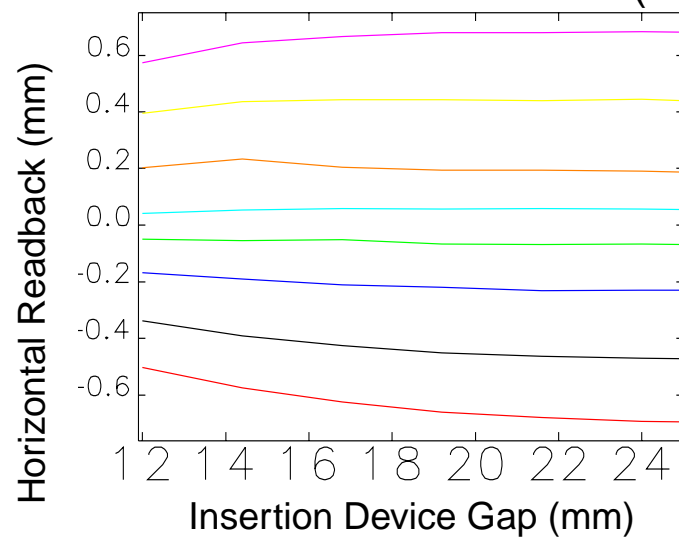
Unmodified Sector (1-ID) Upstream X-ray BPM



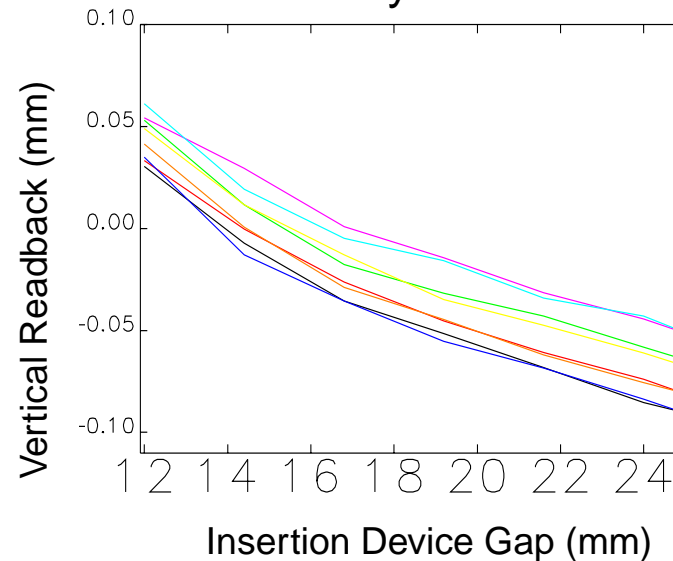
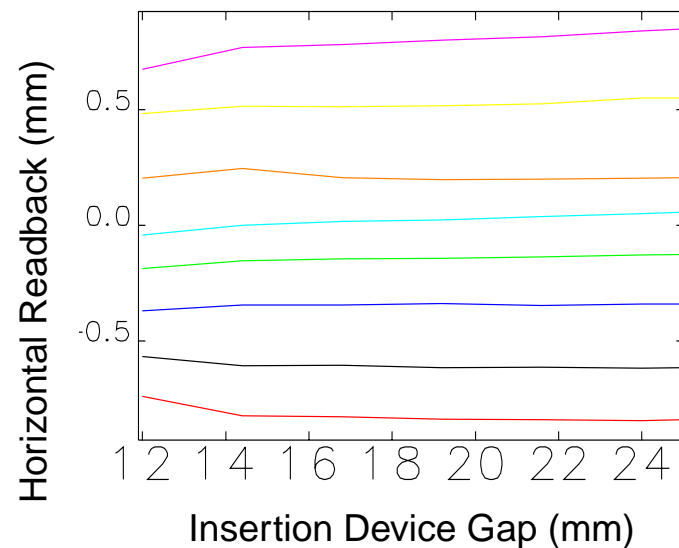
Unmodified Sector (1-ID) Downstream X-ray BPM



Modified Sector (34-ID) Upstream X-ray BPM



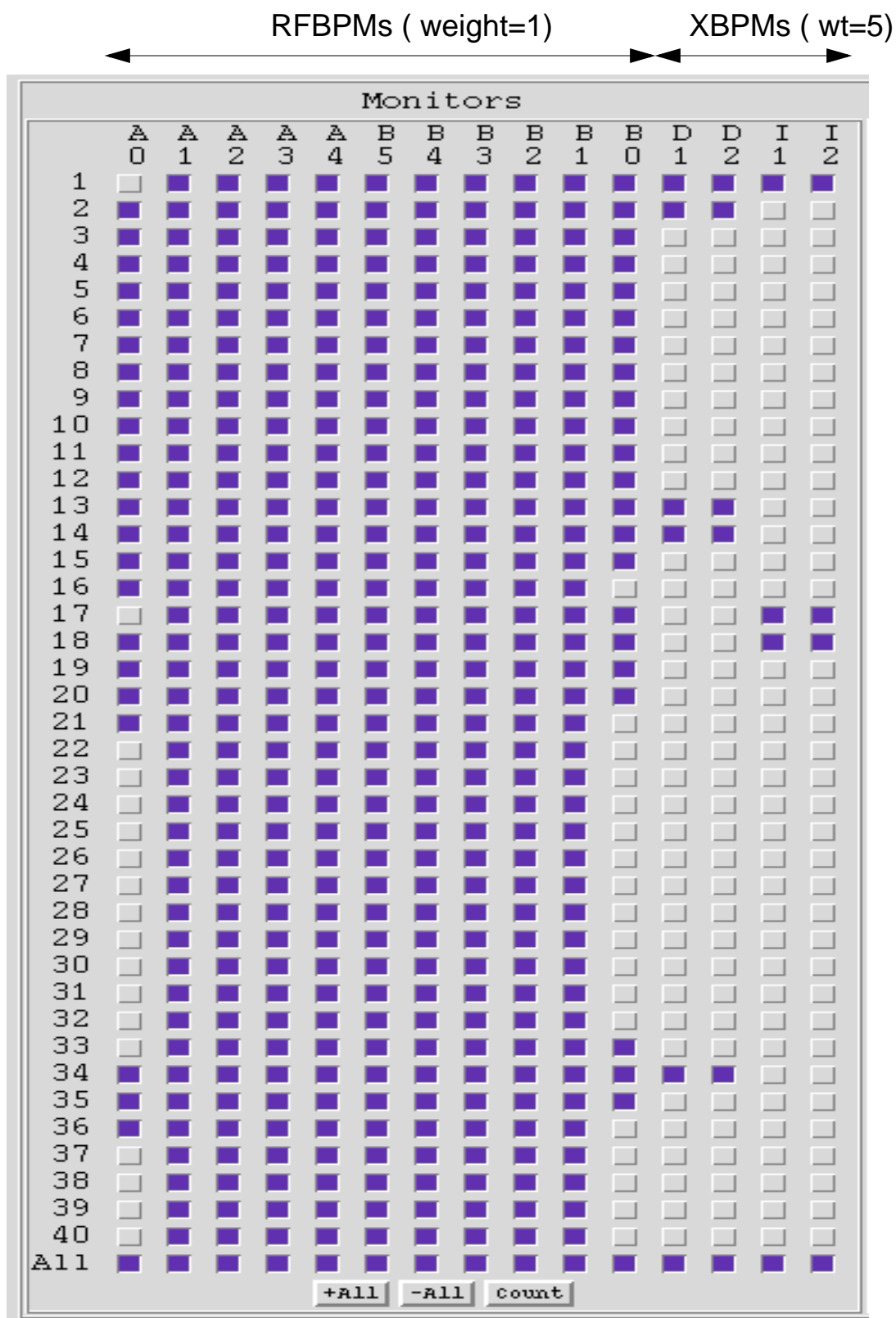
Modified Sector (34-ID) Downstream X-ray BPM



XAXSTF Summary

- Realignment of accelerator girders was performed at 34-ID during the 12/98 accelerator maintenance period with no negative impact on accelerator operation.
- This technique was shown to be effective in reducing the contribution of stray radiation to insertion device X-ray beam position monitor blade signals by up to a factor of ten.
- Research is ongoing to determine justification / need for performing realignment for operational beamlines.

Storage Ring Bpms



Storage Ring Vertical Correctors

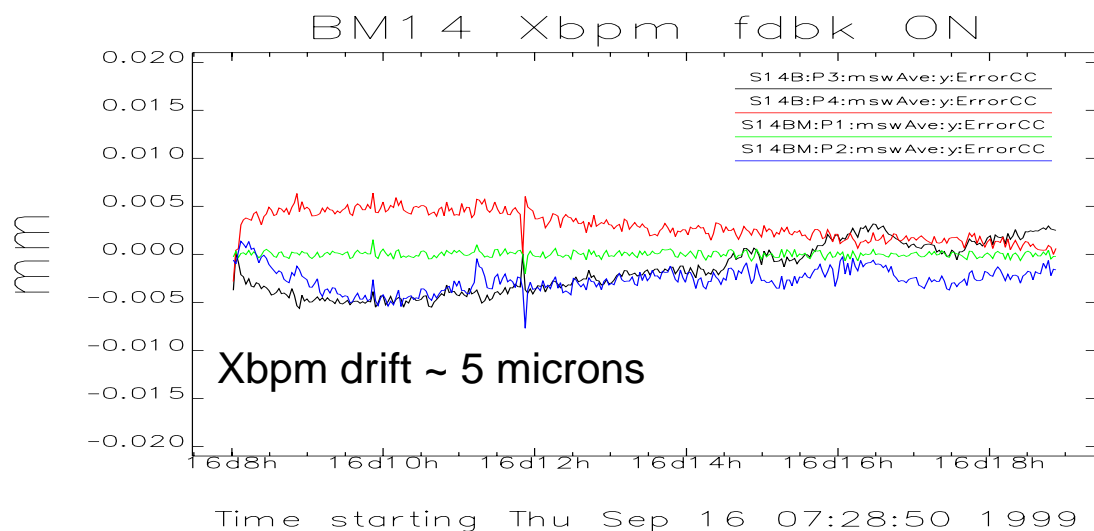
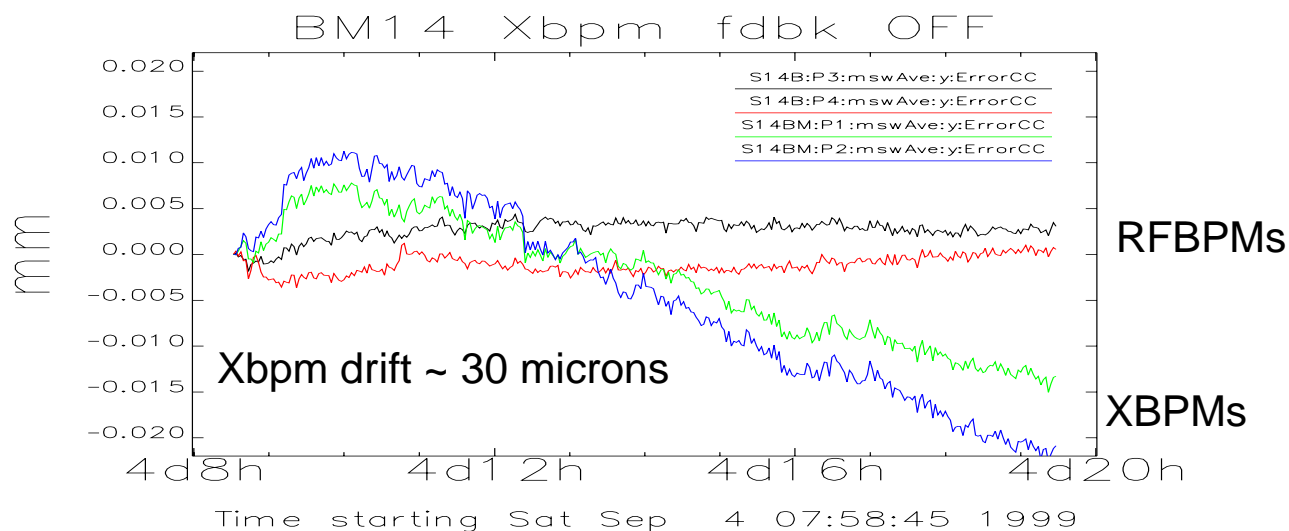
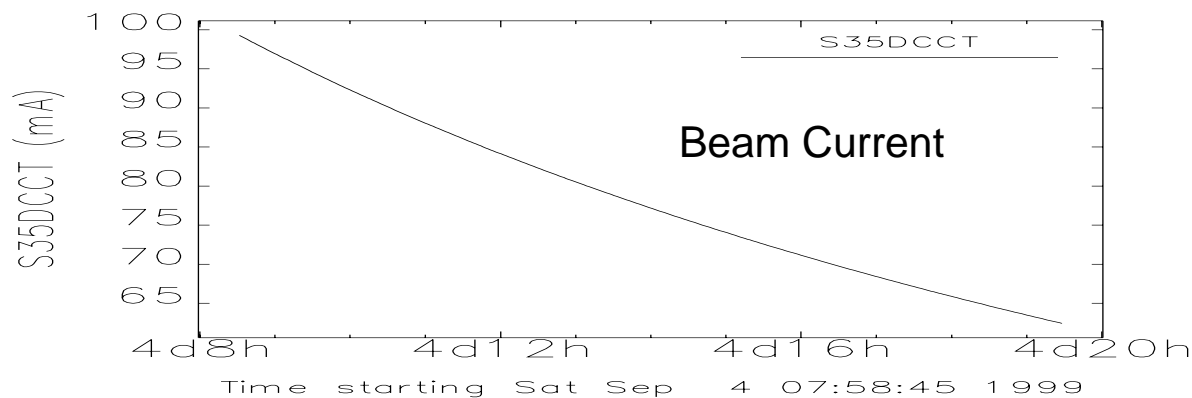
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1. Two columns of correctors (A2/B3) are used for global controls

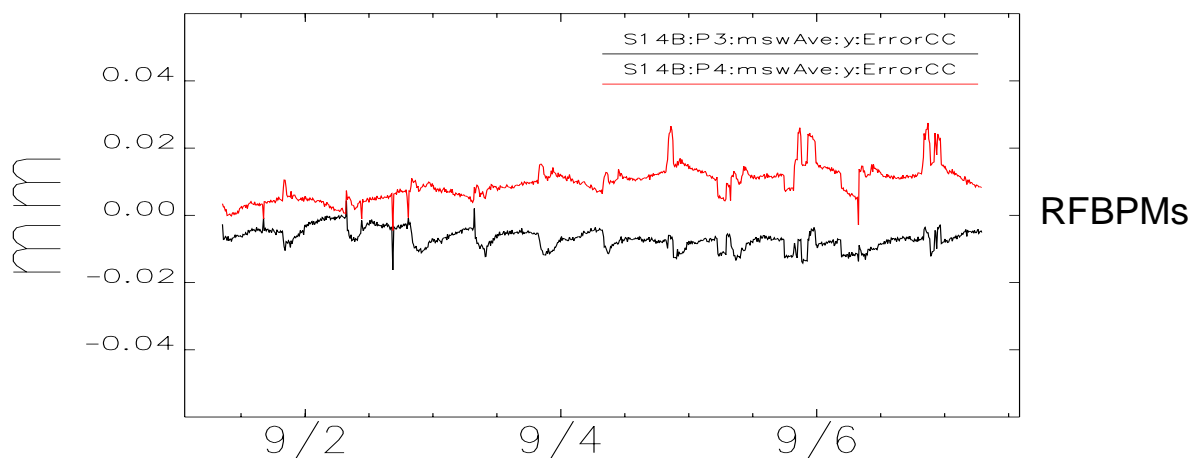
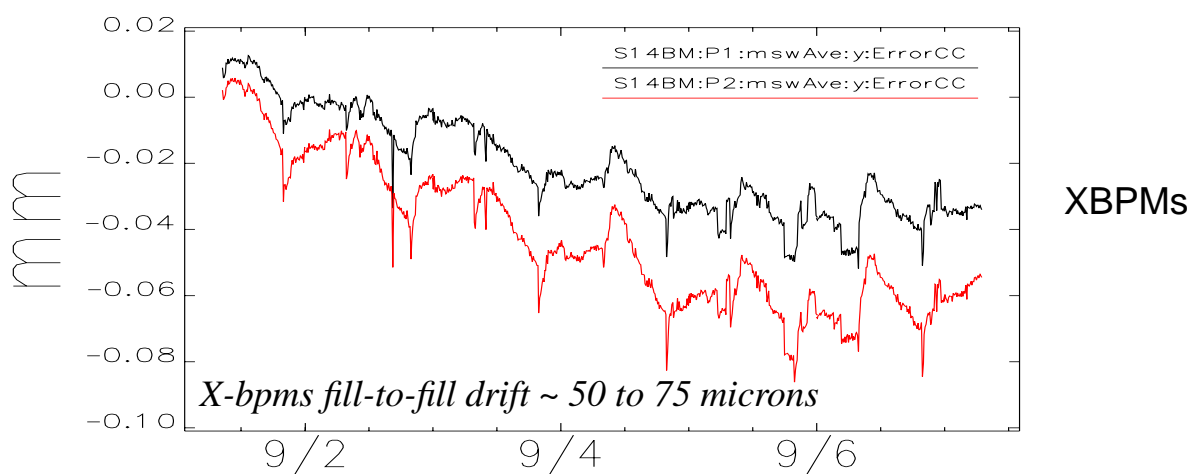
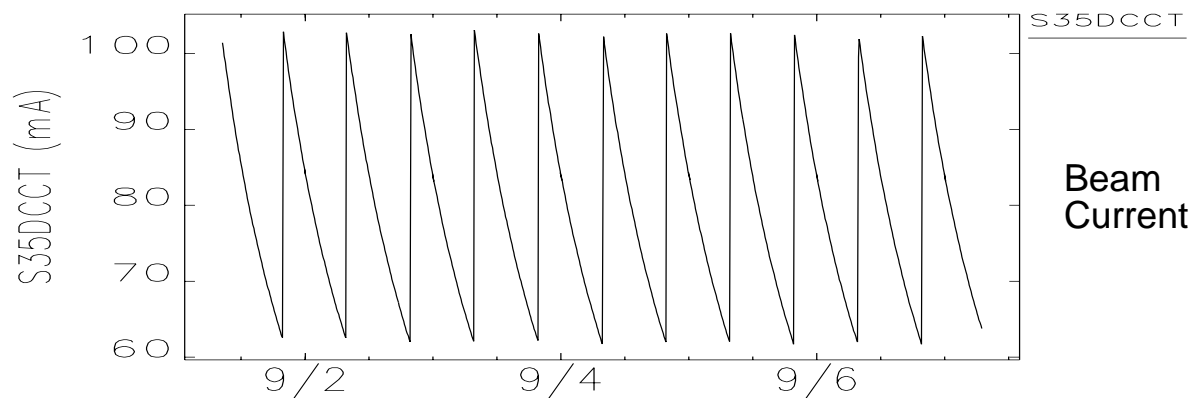
2. Three additional correctors are added for BM14 local controls

3. Two additional correctors are added for ID17 local control

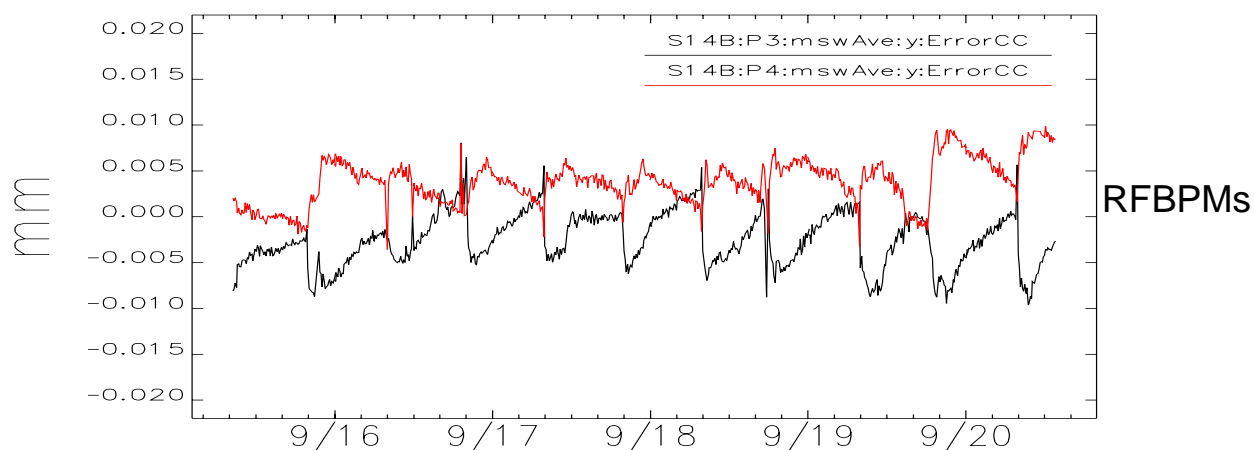
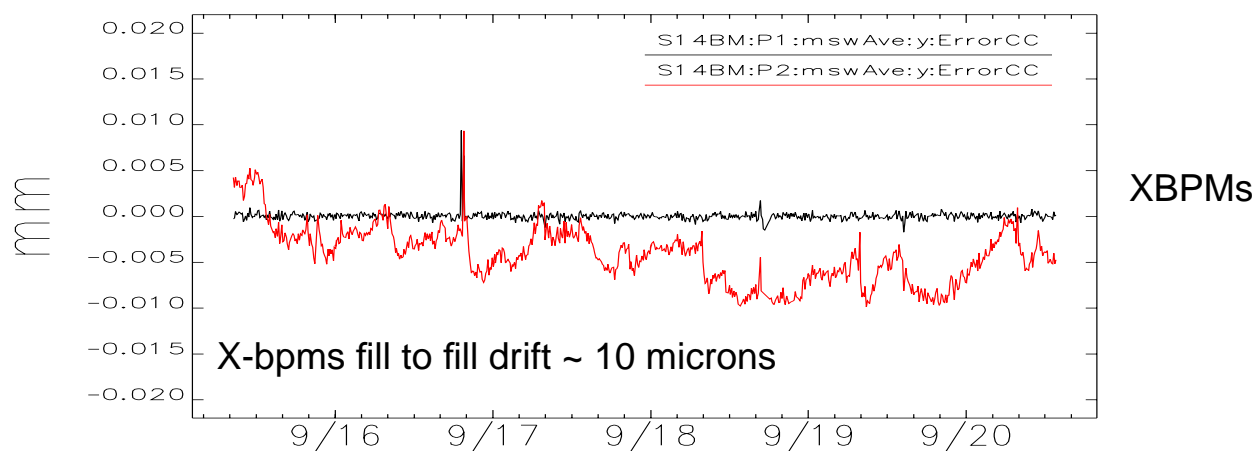
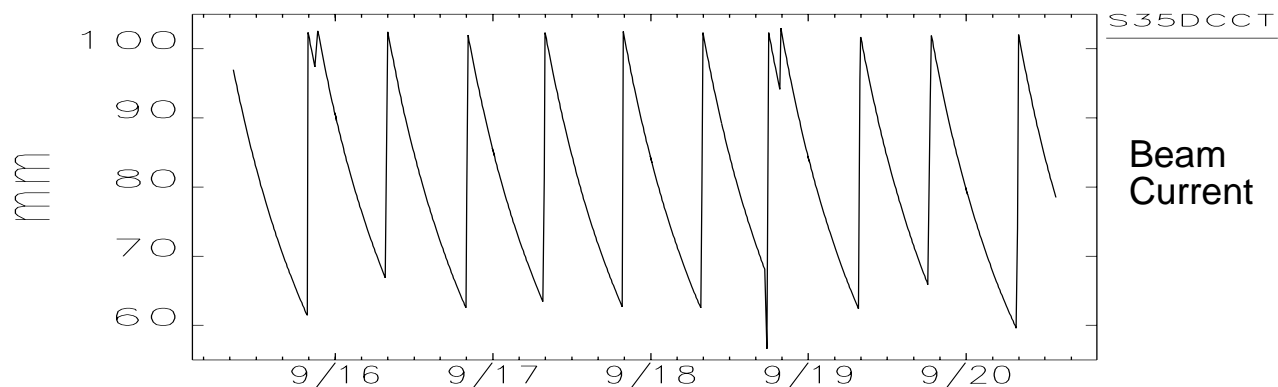
BM14 Xbpm Feedback Results for an Operational Run



BM14 Fill to Fill Data - Feedback Off

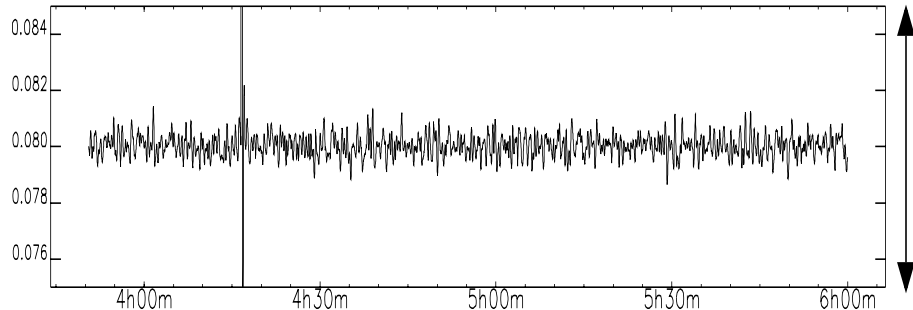


BM14 Fill to Fill Data - Feedback ON



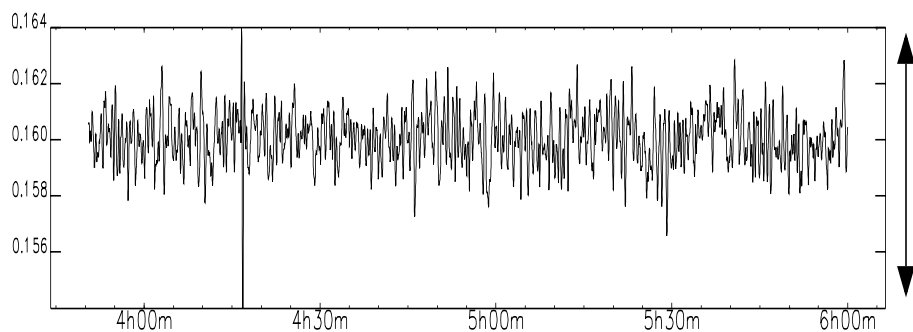
ID17 Xbpm Feedback ON

X-bpm Vertical



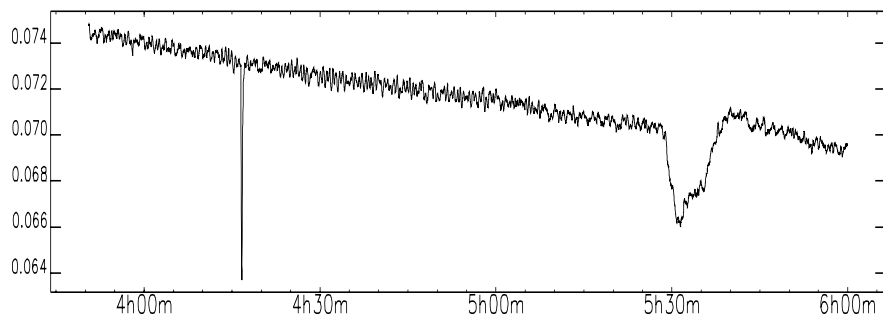
10 Microns

X-bpm Horizontal

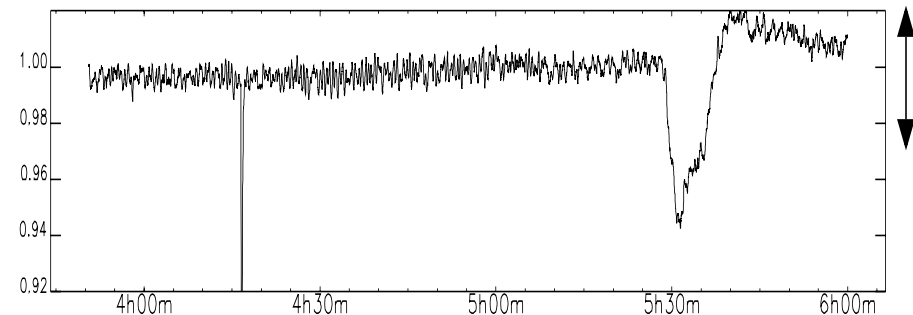


10 Microns

Id17 Ion Chamber



Normalized ID17
Ion Chamber



5 % intensity change

X-bpm based Orbit Control -- Summary

- XBPM electronics upgrade and software modifications have been made in BM14 and ID17 beamline, such that the XBPM orbit control is integrated into the existing operational RFBPM based DC orbit control.
- Results from bending magnet (BM14) XBPM feedback during operational runs have shown that fill to fill drift has been reduced by a factor of 6.
- The work on the insertion device beamline (ID17) is in progress to characterize and compensate for background radiation, before XBPM feedback will be operational.
- Work is in progress to upgrade electronics for all bending magnet beamlines such that both DC and AC orbit feedback can be implemented. Work on the insertion device electronics upgrade will follow.